ON-LINE CASE REPORT

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To close or not to close? Treatment of abdominal compartment syndrome by neuromuscular blockade without laparostomy

J Davies[1], A Aghahoseini[1], J Crawford[2], DJ Alexander[1]

[1]Department of General Surgery, York District Hospital, York, UK
[2]Hull/York Medical School, UK

ABSTRACT

Abdominal compartment syndrome (ACS) is a recognised postoperative complication seen frequently in the intensive care unit (ICU). Surgical decompression and laparostomy remain the gold standard treatment for established ACS, combined with supportive non-surgical therapy, such as nasogastric decompression. In the following case report, we describe our successful management of a patient with established postoperative ACS by re-laparotomy to exclude a reversible cause, immediate re-closure of the abdomen and prolonged neuromuscular blockade, avoiding a laparostomy.

KEYWORDS

Abdominal compartment syndrome – Neuromuscular blockade – Laparostomy

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CORRESPONDENCE TO

John Davies, E: mrjohn.davies@virgin.net

Case history

A 67-year-old man with a history of hypertension was referred to hospital with an isolated raised ALT (85 IU/l) on routine blood testing. On subsequent abdominal imaging with ultrasound, CT, and MRI, he was found to have bilateral adrenal masses, the largest on the right, measuring 9 × 6 × 4 cm. Urinary catecholamines were raised, and a provisional diagnosis of bilateral phaeochromocytoma was made. Following stabilisation with alpha and beta blockade, he underwent bilateral adrenalectomy via a large roof-top incision. The surgery was technically difficult due to a combination of body habitus (body mass index 34 kg/m^2 with extensive intra- and extraperitoneal adipose tissue, in a rather protuberant abdomen) extensive retroperitoneal dissection, and multiple adhesions. A concurrent splenectomy was undertaken for an adhesional splenic capsular tear not controlled by conservative methods. His roof-top incision was closed in the usual fashion and he was extubated postoperatively.

On the first postoperative day, he complained of increasing amounts of abdominal pain, and was noted to have a tense, distended abdomen. He was hypotensive, oliguric and his intra-abdominal pressure (IAP) was markedly raised at 40 mmHg (normal, < 12 mmHg). A presumptive diagnosis of established ACS was made and the patient was taken back to theatre for an exploratory re-laparotomy through the existing roof-top incision (principally to exclude significant postoperative bleeding as a cause for the ACS) which was opened in its entirety. Apart from a non-ischaemic, moderately distended transverse colon, there were no abnormal intraperitoneal findings. After opening the incision, the IAP reduced from 40 mmHg to 28 mmHg.

At this time, a decision was made not to leave the roof-top wound open as a laparostomy, but to instead to close the incision in a standard fashion and to undertake prolonged neuromuscular blockade (atracurium) with mandatory ventilation as primary therapy for his ACS for a trial period. The patient was transferred to the ICU and, during this time period, his IAP started to decrease, which was accompanied by improvement in his physiological indices. After 48 h of neuromuscular blockade, his IAP had reduced to 19 mmHg, neuromuscular blockade was stopped and he was extubated. His IAP subsequently fell to normal levels over the following few days. He made a good recovery and was discharged home 12 days after his initial operation. Histology subsequently revealed bilateral phaeochromocytomas in the resected specimens. The patient remains well 18 months following his surgery, with no clinical herniation detectable in his roof-top scar.

Discussion

Surgical decompression and laparostomy remain the standard treatment for ACS.[1] Nevertheless, although surgical decompression and laparostomy (usually performed through the same incision) can be life-saving, most surgeons will have witnessed both short- and long-term problems with abdominal laparostomies, particularly if early fascial closure is not possible. Lateral abdominal wall defects are much more difficult to reconstruct if early fascial closure cannot be achieved, particularly when they are close to the costal margins,[2] as was the case in the roof-top incision utilised in this patient.

Neuromuscular blockade comprises one of several non-surgical treatments, such as nasogastric decompression and diuretic therapy, which are usually used in addition to surgical decompression for established ACS.[1] Neuromuscular blockade reduces intra-abdominal pressure by improving abdominal wall compliance. However, potential complications of neuromuscular blockade include an increased risk of ventilator-associated pneumonia, increased risk of thrombo-embolic disease and caution is advised, particularly for prolonged use.[3]

Management of ACS using prolonged neuromuscular blockade (up to 48 h) alone as a primary treatment (as opposed in conjunction with surgical decompression and laparostomy) has been reported in the literature only in single patient case report form.[4,5] Unfortunately, both these patients died in the peri-operative period, at 16 days and 14 days, respectively, after their initial abdominal surgeries.

In our case, our choice of initial roof-top incision to perform the bilateral adrenalectomy weighed heavily in our decision to re-close the abdomen and treat the patient's ACS with prolonged neuromuscular blockade. As we considered the risks and benefits of laparostomy, we envisaged many problems in the initial management of a roof-top laparostomy in this patient with an obese protuberant abdomen and feared for failure to achieve early fascial closure, with subsequent major long-term wound management difficulties. We did not consider creating an additional midline laparostomy in addition to a roof-top incision in this patient for concern of abdominal wall devascularisation. With careful consideration of the use of prolonged neuromuscular blockade with its attendant risks, we opted to pursue our course of management with the option of re-operation and laparostomy if he failed to improve with neuromuscular blockade.

We are fortunate that the patient successfully recovered from his ACS with our course of management without a laparostomy but recognise that, even though at re-laparotomy his pressure only reduced marginally, the act of brief decompression of his abdomen before re-closure may have played a part in his successful outcome. To our knowledge this the first published case report where, at re-laparotomy to exclude surgically correctable causes, established ACS has been primarily treated prolonged neuromuscular blockade without a laparostomy with a successful long-term outcome of both incision and patient. In certain selected cases, where a laparostomy is deemed to be high risk, there may be role for such treatment.

References

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